

**REMARKS**

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

***I.     Status of the Claims***

By way of this Amendment and Reply, Claims 10, 12, 13, 15-17, 20, and 24-26 have been amended for clarification purposes, and new Claims 32 and 33 have been added. Support for the amendments and new claims can be found throughout the Specification, for example, in paragraphs [0023] and [0038] of the published application (Pub. No. 2006/0285789). No new matter is added.

Upon entry of the above amendments, Claims 10, 12-17, 19, 20, 22-27 and 29-33 will be pending in this application.

***II.    Objections to the Specification***

In Section 1 of the Office Action, the Specification was objected to for “failing to provide clear support or antecedent basis for terms and phrases in claims 16, 17, 24, and 25.”

Although Applicants do not necessarily agree with the Examiner, by way of this Amendment and Reply and without prejudice or disclaimer, Claims 16, 17, 24, and 25 have been amended to remove the terms and phrases at issue. Thus, the objections to the Specification are now moot.

***III.   Claim Rejections under 35 U. S. C. § 112***

In Section 3 of the Office Action, Claims 16, 17, 24, and 25 were rejected under 35 U.S.C. 112, first paragraph, for failing to comply with the written description requirement.

Specifically, the Examiner asserted that the recitation that the “elongated electrical conductors comprise elongated doped regions located on the semiconductor substrates” in Claims 16 and 24 and the recitation that the “elongated electrical conductors comprise metal rails located on the semiconductor substrates” in Claims 17 and 25 are not supported by the detailed description.

By way of the Amendment and Reply, Claims 16, 17, 24, and 25 have been amended to remove these recitations. Accordingly, the rejections under 35 U.S.C. 112, first paragraph should now be moot.

**IV. Claim Rejections under 35 U. S. C. § 103**

**A. Claims 10, 12-15, 18, 19, 20, 22, 23, 27, and 29-31**

In Section 5 of the Office Action, Claims 10, 12-15, 18, 19, 20, 22, 23, 27, and 29-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over WO/2004094956 (“Michalewicz-1”) or its U.S. equivalent Pat. No. 6,707,308 (“Michalewicz-2”) in view of any of U.S. Patent Nos. 5,265,470 (“Kaiser”), 5,756,895 (“Kubena”), 6,534,839 (“Frazier”), 5,367,136 (“Buck”), and 5,461,916 (“Fujii”). For at least the following reasons, Applicants respectfully traverse the rejections.

Independent Claim 10 recites, among other elements, that “the surface of the first substrate and the surface of the second substrate are **parallel** and a gap between the second substrate and the first substrate is about 15 nm or less **such that** the first and second elongated electrical conductors are opposed to each other at a distance permitting a detectable quantum tunneling current,” and that “the **at least one pair of solid state hinges** are configured to permit a **lateral motion** of the second substrate with respect to the first substrate in a direction transverse to the second direction.” (Emphasis added.)

In contrast, the references cited in the Office Action, whether considered separately or in any combination, fail to disclose, teach or suggest at least the above combination of elements.

On page 4 of the Office Action, the Examiner conceded that the “AAPA” fails to disclose “using a post as a hinge to maintain the positioning of two opposing substrates.” However, the Examiner asserted that the art “well recognizes the suitability of using a post as *a hinge...*,” and relied upon “the front pages of Kaiser, Kubena, Frazier, Buck, and Fujii” as evidence. The Examiner further stated that “it would have been obvious ... to have modified the AAPA ... by using *a hinge*.” (Emphasis added.) Applicants respectfully disagree.

First of all, the Examiner referred to “a hinge” as taught by the references, while Claim 10 recites “**at least one pair** of solid state hinges.” As detailed below, one pair of hinges are different from a single hinge, and the systems having a single hinge as taught by the references cannot be modified to have a pair of hinges otherwise the systems in the references would become inoperable or unsatisfactory for their intended purposes. Thus, the references, even if combined, would still have a missing element of “at least one pair of solid state hinges.”

Moreover, Applicants respectfully submit that Kaiser, Kubena, Frazier, Buck, and Fujii fail to supply what the “AAPA” lacks with respect to the “at least one pair of solid state hinges” and the associated “lateral motion of the second substrate with respect to the first substrate in a direction transverse to the second direction.”

Specifically, Kaiser teaches (see, e.g., Fig. 1, reproduced below) driving the beam 34 in a *vertical direction to vary the gap 14* between the tunneling tip 16 that is at the *free end of the beam*. Thus, Kaiser does not supply “a pair” of hinges or the “lateral motion,” nor are the beam 34 and tip 16 “parallel.” Rather, modifying Kaiser to have “a pair” of hinges would only **hinder the ability of the supposedly “free end” to move freely**.

Furthermore, although Kaiser is silent with respect to the size of the gap 14, it is likely that the gap 14 is larger than 15 nm due to the use of the tip as opposed to tunneling between elongated conductors. If Kaiser were modified to have a gap of 15 nm or less, the flexibility of the beam 34 as required by Kaiser, under the vertical drive force, or even under gravity, will likely result in the bending of the beam 34 thereby closing the gap of 15 nm or less and causing a short circuit.

If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Thus, there is no reason, motivation, or suggestion to combine Kaiser with “AAPA” or to modify the teachings therein to arrive at the claimed embodiments.

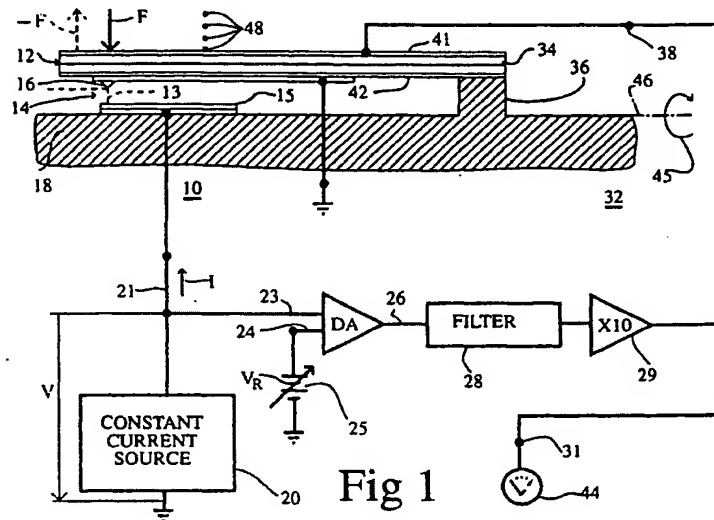
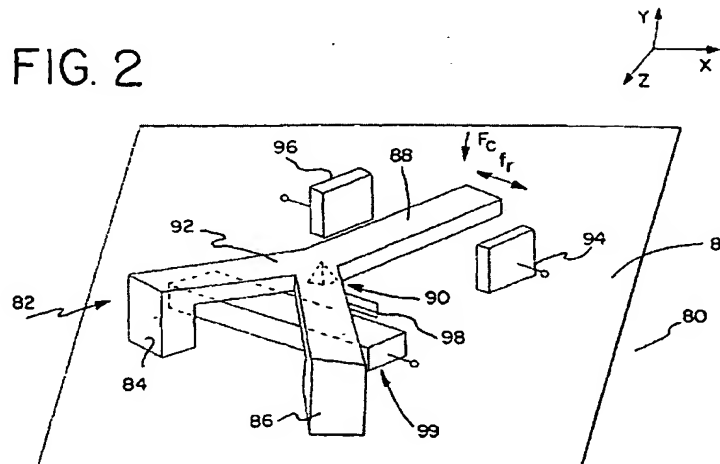


Fig 1

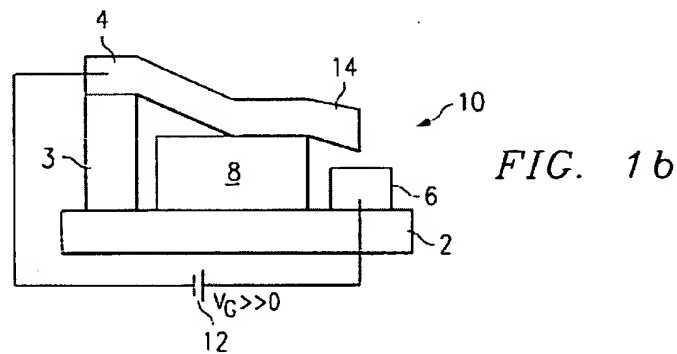
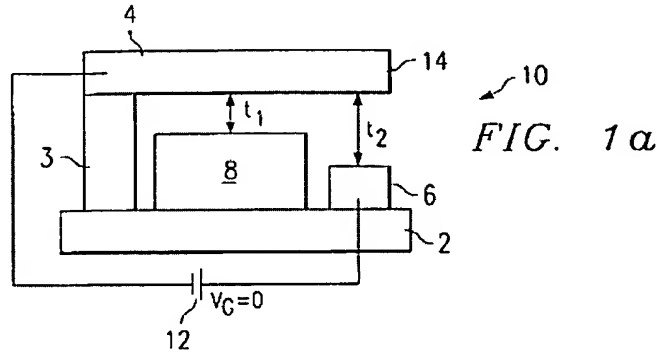
Kubena, like Kaiser discussed above, also teaches (see, e.g., Fig. 2, reproduced below) a cantilever 88 having a free end allowing a vertical motion caused by the Coriolis forces  $F_c$ . In addition, Kubena also teaches a configuration employing a tip 90. Thus, it would be also inoperable or render the system of Kubena unsatisfactory for its intended purpose if Kubena were to be modified or combined with other references. In addition, the combined elements would still have missing elements.

FIG. 2

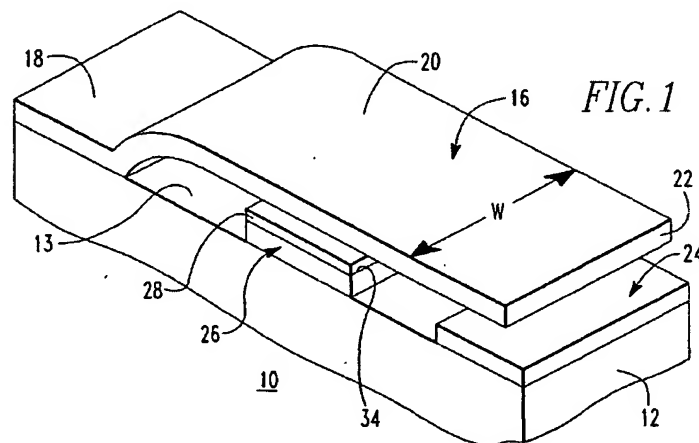


Frazier is directed to a switch (see, e.g., Figs. 1a and 1b, reproduced below) having a free-end cantilever beam 14, which requires a vertical motion to open or close the switch. Thus, for reasons similar to those discussed above with respect to Kubena and Kaiser, Frazier

cannot be combined with other references, and even if combined, the modified teachings do not arrive at the claimed embodiments.

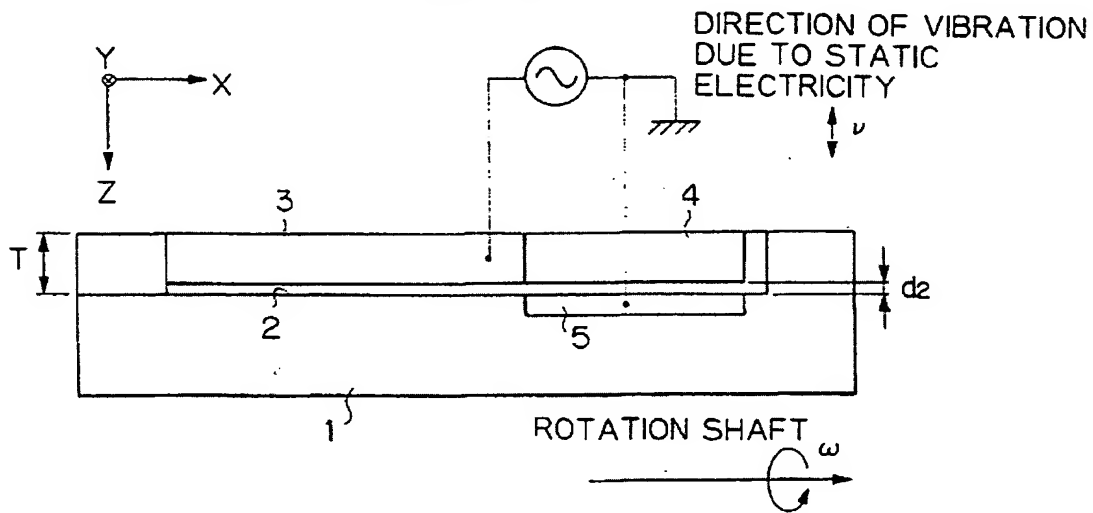


Buck also teaches an unsupported cantilever 16 (see, e.g., Fig. 1, reproduced below). The width  $W$  of the cantilever 16 clearly *prohibits a lateral motion* of the cantilever. Thus, Buck teaches away from the claimed embodiments.



Like the references discussed above, Fujii also teaches a cantilever beam 4 that has a free end and requires a vertical motion (see, e.g., Fig. 2, reproduced below). Thus, modifying Fujii to have a pair of hinges would render system being modified unsatisfactory for its intended purpose.

*Fig. 2*



In view of the above, the cited references, even if combined, fail to disclose, teach, or suggest all of the elements recited in independent Claim 10. In addition, there is no reason, motivation or suggestion to combine these references, and many of the references teach away from the combination. Thus, Claim 10 and its associated dependent claims are patentable over the cited references for at least the reasons set forth above.

Independent Claim 20 recites, among other elements, that “the solid state hinge permits an angular rotation of the second substrate with respect to the first substrate and is also configured to provide electrical connection to at least one of the first or second plurality of elongated electrical conductors.”

In contrast, the cited references are silent with respect to a hinge “configured to provide electrical connection.” Thus, Claim 20 and its associated dependent claims are patentable over the cited references for at least this reason.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejections of Claims 10, 12-15, 18, 19, 20, 22, 23, 27, and 29-31.

B. Claims 16 and 24

In Section 6 of the Office Action, Claims 16 and 24 were rejected as being unpatentable over PGPUB US 2006/0285789, i.e., the published present application, in view of Roundtree (U.S. Patent No. 5,977,596) because the features recited in Claims 16 and 24 allegedly lose their filing date and were accorded priority as of the filing of the amendment introducing them.

Although Applicants do not necessarily agree with the Examiner, Claims 16 and 24 have been amended to remove the features at issue. Thus, this rejection of Claims 16 and 24 are now moot.

In Section 8 of the Office Action, Claims 16 and 24 were also rejected as being unpatentable over "AAPA," "Michalewicz-1," "Michalewicz-2," in view of any of Kaiser, Kubena, Frazier, Buck, and Fujii, further in view of Roundtree.

As discussed above, the base Claims 10 and 20 are believed patentable over these references. Roundtree fails to supply what the other references lack. Thus, Claims 16 and 24 are allowable for at least the same reasons.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of Claims 16 and 24.

C. Claims 17 and 25

In Section 7 of the Office Action, Claims 17 and 25 were rejected as being unpatentable over PGPUB US 2006/0285789, i.e., the published present application, in view of Jones (PGPUB US 2003/0036244) because the features recited in Claims 17 and 25 allegedly lose their filing date and were accorded priority as of the filing of the amendment introducing them.

Although Applicants do not necessarily agree with the Examiner, Claims 17 and 25 have been amended to remove the features at issue. Thus, this rejection of Claims 17 and 25 are now moot.

In Section 9 of the Office Action, Claims 17 and 25 were also rejected as being unpatentable over “AAPA,” “Michalewicz-1,” “Michalewicz-2,” in view of any of Kaiser, Kubena, Frazier, Buck, and Fujii, further in view of Roundtree.

As discussed above, the base Claims 10 and 20 are believed patentable over these references. Roundtree fails to supply what the other references lack. Thus, Claims 17 and 25 are allowable for at least the same reasons.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejections of Claims 17 and 25.

D. Claim 26

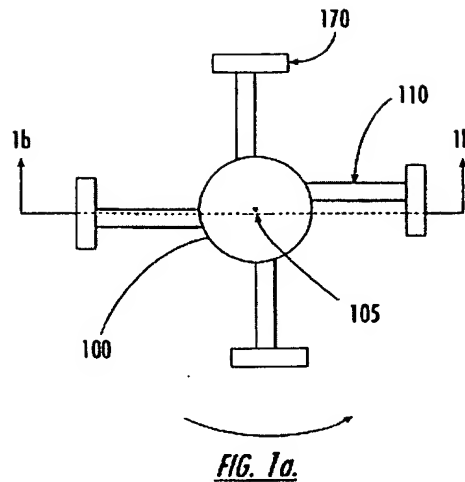
In Section 10 of the Office Action, Claim 26 was rejected as being unpatentable over “AAPA,” “Michalewicz-1,” “Michalewicz-2,” in view of any of Kaiser, Kubena, Frazier, Buck, and Fujii, further in view of Hill (U.S. Patent No. 6,137,206).

Claim 26 depends from Claim 20. As in the discussions above with respect to Claim 20, the references cited therein fail to disclose, teach, or suggest at least that “the solid state hinge permits an angular rotation of the second substrate with respect to the first substrate and is also configured to provide electrical connection to at least one of the first or second plurality of elongated electrical conductors.” Hill fails to supply what the other references lack. Thus, Claim 26 is patentable over the cited references for at least the reasons set forth above.

In addition, amended Claim 26 recites, among other elements, that “at least two of the solid state hinges are aligned with the center of the second substrate.”

In contrast, the cross-shaped support structures in Hill are “mis-aligned,” (see, e.g., Fig. 1a, reproduced below).





Thus, Claim 26 is patentable over the cited references, and Applicants respectfully request reconsideration and withdrawal of the rejection of Claim 26.

**V. New Claims 32 and 33**

Newly added Claim 32 depends from Claim 10, and thus is patentable for at least the same reasons as Claim 10. Newly added Claim 33 recites features similar to those of Claim 10, and additionally recites that “the gap does not substantially vary during said lateral motion.” Thus, Claim 33 is patentable for at least the reasons discussed above with respect to Claim 10, and for the additional reason that most of the references require a variable gap (thereby teaching away from the claimed embodiment).

Accordingly, Applicants respectfully request entry and allowance of new Claims 32 and 33.

**VI. Conclusion**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith,

Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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